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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003903767 for a patent by STEVEN KENESSEY as filed on 21 July 2003.

WITNESS my hand this
Sixth day of August 2004

J. Billingsley

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

AUSTRALIA
Patents Act 1990

Provisional SPECIFICATION
PROVISIONAL APPLICATION for a Patent

ECO TOWER – power generator using heat from the sun, the wind and from buildings and air pump driven by wind.

The following statement is a full description of this invention, including the best method of performing it known to me:

ECO TOWER
Provisional Patent

Applicant and designer: Steven Kenessey

The eco tower is normally one or a combination of various aspects with the purpose of creating air movement that can be converted into electricity, as well as, if desired, exhaust polluted air from urban environments and Purify downward moving air. preferably
A small scale version of the spiral tower may be used to pump air and is driven by the wind.

The eco tower may preferably be used to exhaust used air and generate electricity from places such as city centres by utilising heat from air conditioning systems in surrounding buildings and/or from the sun's energy and/or by harnessing the energy of the wind. Preferably the eco tower will incorporate all three methods simultaneously in such a way that they will augment each other.

Also preferably, when the system is used in conjunction with a landscaped (flora covered) interior portion of the tower, which is configured in a spiral formation, air may be drawn into the tower by the cooling process associated with the extraction of the heat from the water gathered from the air conditioning systems from surrounding buildings.
Each of these above systems preferably may be used together in such a manner so as to augment the functioning of entire system in total. They may also be used as separate systems or in any combination.

The Heat Chimney
One system (the heat chimney) utilises the heat exhausted from air conditioning systems and uses it to create an updraft of air in tower, which may be harnessed with the use of wind driven turbine generators either within the tower or within or connected to the air intake of the tower supplying the updraft of air within the tower. This system may be used as a separate system. As well as generating electricity it may also be used to exhaust dirty or used air from a densely populated urban area in close proximity to buildings with mechanical air conditioning systems. Also preferably the tower it may be incorporated with other functions. For example is may also be use as a look out tower with restaurants and other recreational or tourist facilities. Also the system may preferably be incorporated into the design of an office tower, the chimney being used in the core of the building and preferably in conjunction with the lift shaft. preferably

Preferably this system will be used help to prevent the build up of heat around major cities (commonly known as the heat island effect) by extracting heat from buildings and releasing the same heat in the tower (a very tall chimney) and venting it in the upper atmosphere above the city and generate electricity for the city at the same time.

Heat trap
The second system (the heat trap system) relies on the heat of the sun to generate hot air within the tower. It collects the suns heat by trapping the heat of the suns rays within an air cavity between two layers of glass. The external layer of glass allows the heat from the suns rays to pass through it from the outside to the inside, however it prevents the majority of the same heat from passing through the same glass from the inside to the outside atmosphere. Once the heat from suns rays pass through the air cavity the majority of it is prevented from passing through the second layer of glass with reflects the same heat radiation back into the air cavity and effectively trapping the heat. Preferably this same heat trap may be incorporated into the outer façade of the tower and also preferably it may be incorporated into a glass roof structure at the base of the tower and connected to it in such a way that the heat may flow from the heat trap cavity in the glass roof into the heat trap cavity in the façade of the tower. The glass roof would be ideal for providing shelter over a large public square as it would allow the suns light to illuminate the space whilst preventing excessive heat build up as well as making the space usable during times of wet or inclement weather. The combination of heat trapped within the roof cavity and within the tower façade rises up the cavity surrounding the tower. This rising air may be utilised to drive wind turbine generators to generate electricity. can
It may be used in conjunction with the heat chimney system described above, the façade cavity, in this case, forming the chimney into which the heat from air conditioning units is released. In this way heat from air conditioning systems and from the sun is combined within the one chimney.

Spiral cavity

The third method of generating an updraft within the tower is to form a spiral formation in the façade of the tower in such a way as to gather the wind flowing around the tower and direct it into a spiral cavity following the line of the spirally formed façade, and thus forcing the wind up the spiral cavity, drawing air behind in from within the cavity. The spiral façade preferably should allow air into its cavity and not out, in this way the air pressure caused by the wind entering the spiral cavity will force air up the spiral cavity as it can only escape from the top of the tower.

Preferably the tower will incorporate all three methods of creating an upward movement of air in such a way that they will augment each other. Preferably the spiral cavity will be divided into two sections; an upper and a lower section along its length. The upper section may be open to the external atmosphere and would use flaps, valves or other devices, which may preferably be computer controlled and, in most instances, be used to allow wind to blow into the upper section and prevent the same wind from exiting the upper section unless the same wind is nearing the top of the tower. As the air flows up the tower, low air pressure would be created at the base of the tower drawing air through air intake device(s) and or through a sun heated air cavity in a glass roof at the base of the tower.

The lower section would be divided from the upper section preferably with the use of flaps, valves or other devices, which may be computer controlled and, in most instances, be used to allow air to be sucked into the upper section and prevent the same wind from returning into the lower section. The lower section is to be connected to the air intake of the tower at its base and therefore may form the means to supply air to the upper section along its entire length.

The air from the lower section may be drawn into the upper section by one or both of two means. In the first means, air would be drawn into the upper section when the air pressure in the upper section is lower than the air pressure in the lower section, thus causing air to flow from the lower to the upper section of the spiral cavity in order to equalise the air pressure. The differential in air pressure between the upper and the lower section would be caused by the movement of air up the spiral cavity creating lower air pressure in the upper section the closer it is to the base of the tower. Also, wind may preferably be prevented from entering the upper section in the area close to the base and this should preferably be regulated by computer or (other means) in such a way as to maximise the updraft and sucking power caused by the wind within the spiral cavity.

The centrifugal force acting on air may also cause a differential in air pressure as it moves upward in a spiral formation causing greater air pressure at the outer perimeter of the upper section of the spiral cavity. Preferably the valves, flaps or other devices that divide the upper section from the lower section should be used to allow air to flow from the lower section into the upper section where the air pressure differential is at its greatest (i.e. where it is closest to the inner core).

The second means by which the air may be drawn from the lower section into the upper section of the spiral tower is by a method that makes use of the 'Venturi effect', in which the flow of air past a opening draws air into the same opening and into the slipstream of the air. The flaps, valves or other devices that separate the upper section from the lower section may preferably also be used to draw air from the lower section into the upper section of the spiral cavity by maximising the said 'Venturi effect'. This effect, set up when air flowing in the upper section passes over the openings that separate it from the lower section, should preferably be regulated by computer controls or by other means in order to achieve maximum updraft when required.

The wind-inducted movement of air up the spiral cavity of the tower would naturally be dependant on the velocity of the surrounding wind and therefore be sporadic. The same upward air movement in the tower would also be augmented by the upward movement of hot air (hot air being air that is hotter than the outside atmosphere). The heat chimney method of generating hot air together with the heat trap method will cause air to flow up the spiral cavity of the tower regardless of the wind velocity. This system may also preferably incorporate a vertical shaft that connects the upper spiral cavity at the base of the tower to the lower spiral cavity near the top of the tower providing two ways for the air to flow and depending on a combination of all the conditions, will flow in the direction of the lowest air pressure. As valves, flaps or other devices will preferably be positioned between the vertical shaft and the upper spiral cavity along its length the system may further be augmented by a flow of air between the vertical shaft and the upper spiral cavity when appropriate. When the pressure differential between the upper spiral cavity and the vertical shaft is big enough it will cause air to be sucked into the upper spiral cavity from the vertical shaft and thus increase the velocity of the air movement up the vertical shaft. Preferably this vertical shaft should be positioned close to the core and preferably surround the core in this way the centrifugal forces acting on the air flowing up the spiral cavity may be harnessed to induce increase updraft in the vertical shaft.

Also preferably the system may be used with plants and vegetation (an interior landscape) established in the core of the building and so configured so as to purify and oxygenate the incoming air and preferably further direct the air to provide a healthy atmosphere for people close by (for example in a large public space that may be

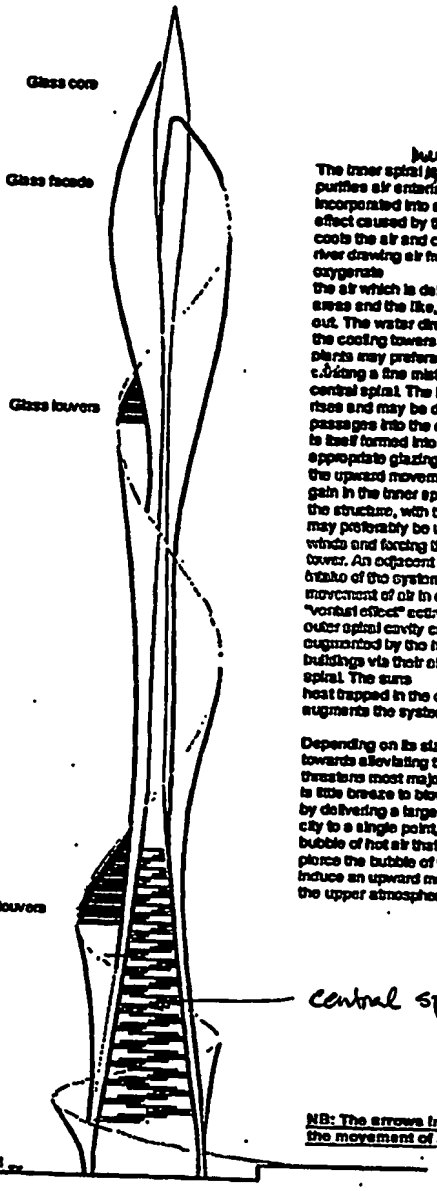
covered with the said glass roof structure). This interior landscape may preferably be configured in a spiral formation with air entering from the top of the tower and flowing down the landscaped spiral being cooled by the landscape as it flows – the cooling effect promoting the downward flow. Preferably the cooling effect may be augmented by using the spiral tower to cool water piped from the air conditioning units from surrounding buildings (especially office towers). The by-product of extracting the heat from the water of air conditioning systems is cooled water. As previously mentioned the water would be used in the outer cavities of the tower to promote updraft and the cooled water, in the form of a fine mist spray, would irrigate the landscape. After filtering through the landscape the same water would be piped back into the air conditioning systems from where they originated and thus completing the cycle.

The inner spiral is a stepped landscape, which purifies air entering from above. Flora may preferably be incorporated into a spiral configuration. The evaporative effect caused by the plants and their irrigation system, cools the air and causes it to flow down the spiral like a river drawing air from above. Plants detoxify and oxygenate the air which is delivered into public spaces, habitable areas and the like, and preferably pushing used air up and out. The water directed from the cooling towers of surrounding air conditioning plants may preferably be used to help irrigate the plants by creating a fine mist spray over the pants in the central spiral. The heat released through this method rises and may be directed via computer regulated passages into the outer cavity of the structure, which is itself formed into a double spiral and with the appropriate glazing will become a heat trap causing the upward movement of hot air and regulating the heat gain in the inner spiral. The shape of the façade of the structure, with the use of computer regulated flaps, may preferably be used as a wind scoop - capturing the winds and forcing the air to spiral upwards within the tower. An adjacent and lower spiral cavity forms the air intake of the system. The vacuum created by the upward movement of air in combination with a computer regulated "venturi effect" acting along the entire length of the double outer spiral cavity creates an enormous air pump augmented by the heat released from surrounding buildings via their air conditioning systems within the inner spiral. The suns heat trapped in the outer spiral cavity also may be used to augments the system.

Depending on its size, this system may go a long way towards alleviating the "heat island effect" which threatens most major cities. On still days when there is little breeze to blow away the hot air, the tower, by delivering a large amount of heat high above the city to a single point, will conceivably create a bubble of hot air that will push upward and in effect
pierce the bubble of warm air surrounding the city and induce an upward movement thus "draining" the air into the upper atmosphere.

The inner spiral is a stepped landscape, which purifies air entering from above. The evaporative effect caused by the plants and their irrigation system, cools the air and causes it to flow down the spiral like a river drawing air from above. Plants detoxify and oxygenate the air which is delivered into the memorial site creating a micro climate in the field of dreams and pushing used air up and out. The water directed from the cooling towers of surrounding air conditioning plants may be used to help irrigate the plants by
creating a fine mist spray over the pants in the central spiral. The heat released through this method rises and may be directed via computer regulated passages into the outer cavity of the structure, which is itself formed into a double spiral and with the appropriate glazing will become a heat trap causing the upward movement of hot air and regulating the heat gain in the inner spiral. The shape of the façade of the structure resembles an unfolding leaf which, with the use of computer regulated flaps, becomes a giant wind scoop - capturing the winds and forcing the air to spiral upwards. An adjacent and lower spiral cavity forms the air intake of the system. The vacuum created by the upward movement of air in combination with a computer regulated "venturi effect" acting along the entire length of the double outer spiral cavity creates an enormous air pump augmented by the heat released by the landscaped inner spiral and the suns heat trapped in the outer spiral cavity. The result is free energy forever from a process of purification.

All of the above configurations and systems or any combination of the above systems may be integrated with subways and/or road tunnel systems in order to ventilate them and used the heat exhausted from them to augment the above mentioned systems. In this way the heat generated from motor vehicles, trains and other equipment as well as people may be used to generate electricity and promote the entry of clean air into urban environments.



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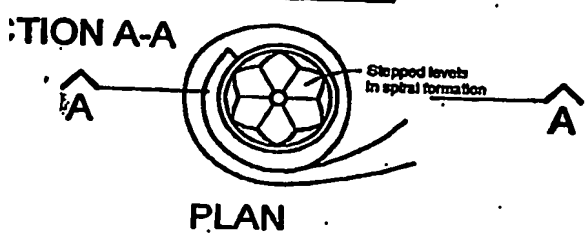
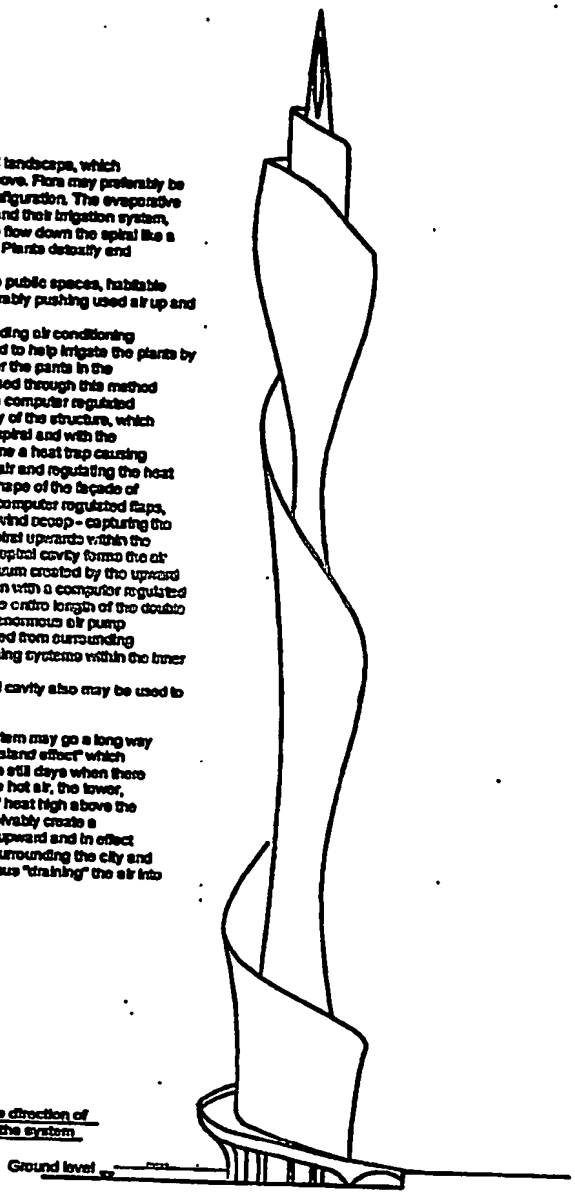
NB: The arrows indicate the direction of the movement of air within the system

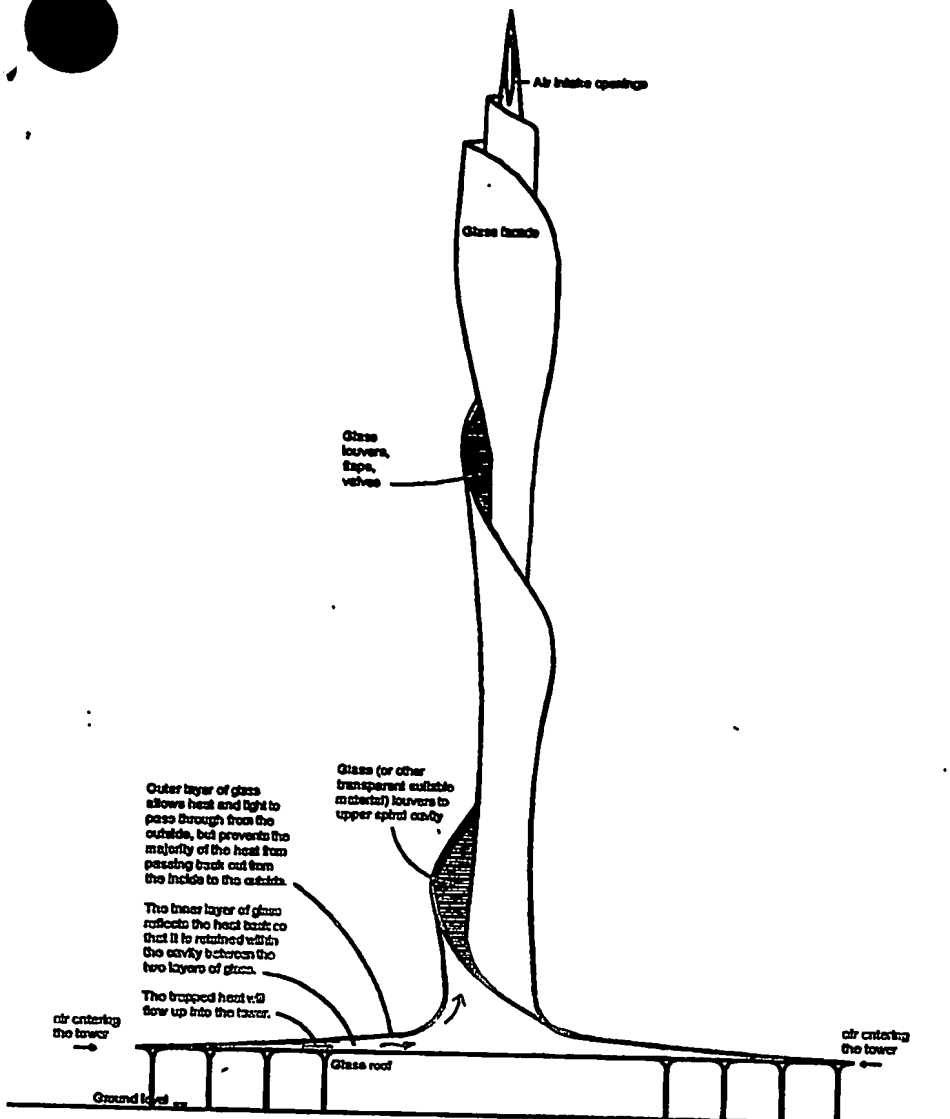


PLAN

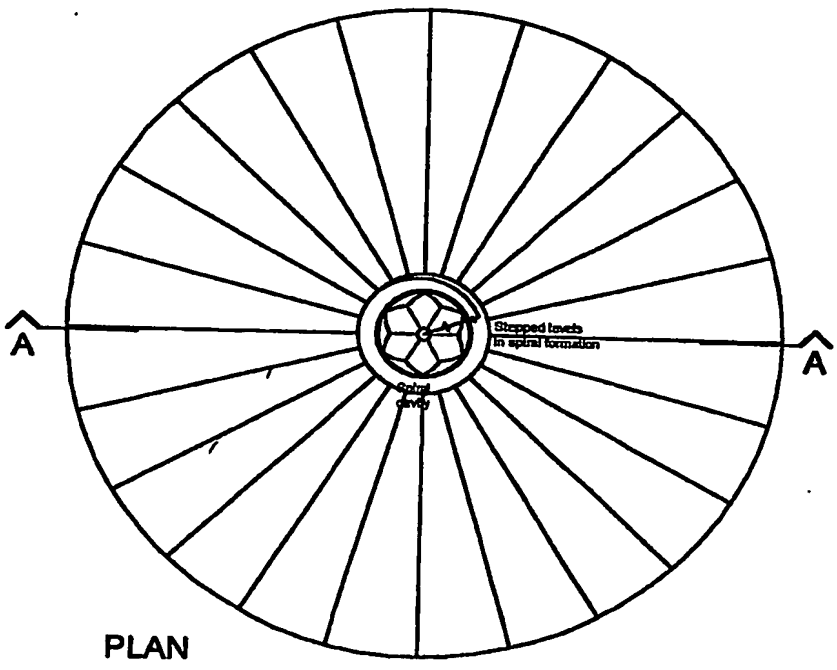


ELEVATION

SPIRAL TOWER
integrating the spiral facade, heat trap and the heat chimney



ELEVATION



PLAN

four sides of the spire. Preferably the air intake may be computer regulated so that one, two, three of all four openings may operational depending on wind conditions and other factors normally determined by the efficiency of the system.

Air intake openings

Central shaft

If the system is used in the form of a large tower, other functions may be incorporated into the structure, such as look outs, restaurants, function rooms and tourist facilities. The system may also be incorporated into commercial buildings.

Glass facade

Valves, flaps, computer regulated openings between the vertical shaft and the upper spiral cavity regulate air flow between the two air passages and may be used to increase the efficiency of the system.

Glass louvers as seen from inside the cavity

Glass louvers, flaps, valves

Upper spiral cavity

The glass louvers to the upper spiral cavity allow light and heat in, as does the outer layer of glass cladding the tower and the connected glass roof, however, the same louvers also allow wind to pass through and into the upper spiral cavity, forcing the wind to flow up the spiral. The same louvers also prevent the wind from escaping from the upper spiral cavity into the outside atmosphere, especially when the louvers are on the leeward side of the tower.

Transparent louvers, flaps, valves separating the lower spiral cavity from the upper

Central core

Vertical shaft

Lower spiral cavity

Preferably, the updraft of air created by the system may be used to generate electricity with the use of wind turbines positioned within the tower or within the air intake to the glass roof or within the glass roof itself. Also, preferably, a combination of all three above mentioned positions may also be incorporated.

Glass (or other transparent suitable material) louvers to upper spiral cavity

Outer layer of glass allows heat and light to pass through from the outside, but prevents the majority of the heat from passing back out from the inside to the outside.

Upper spiral cavity

Transparent louvers to lower spiral cavity

The inner layer of glass reflects the heat back so that it is retained within the cavity between the two layers of glass.

Lower spiral cavity

Preferably an inner part of the tower may have a landscaped area configured in a spiral formation in such a way that air, as it is cooled, may flow down the spiral, preferably flowing mostly through the flora within the landscaped areas. In this way the air is further cooled, oxygenated and largely detoxified, by being in contact with many plants. The same air flowing to the bottom of the tower may then be directed to area that are preferably of benefit to people and/or animals, such as large open air public urban spaces.

The trapped heat will flow up into the tower.

air entering the tower

Glass roof

air entering the tower

Ground level

SECTION A-A

NB: The arrows indicate the direction of the movement of air within the system

A

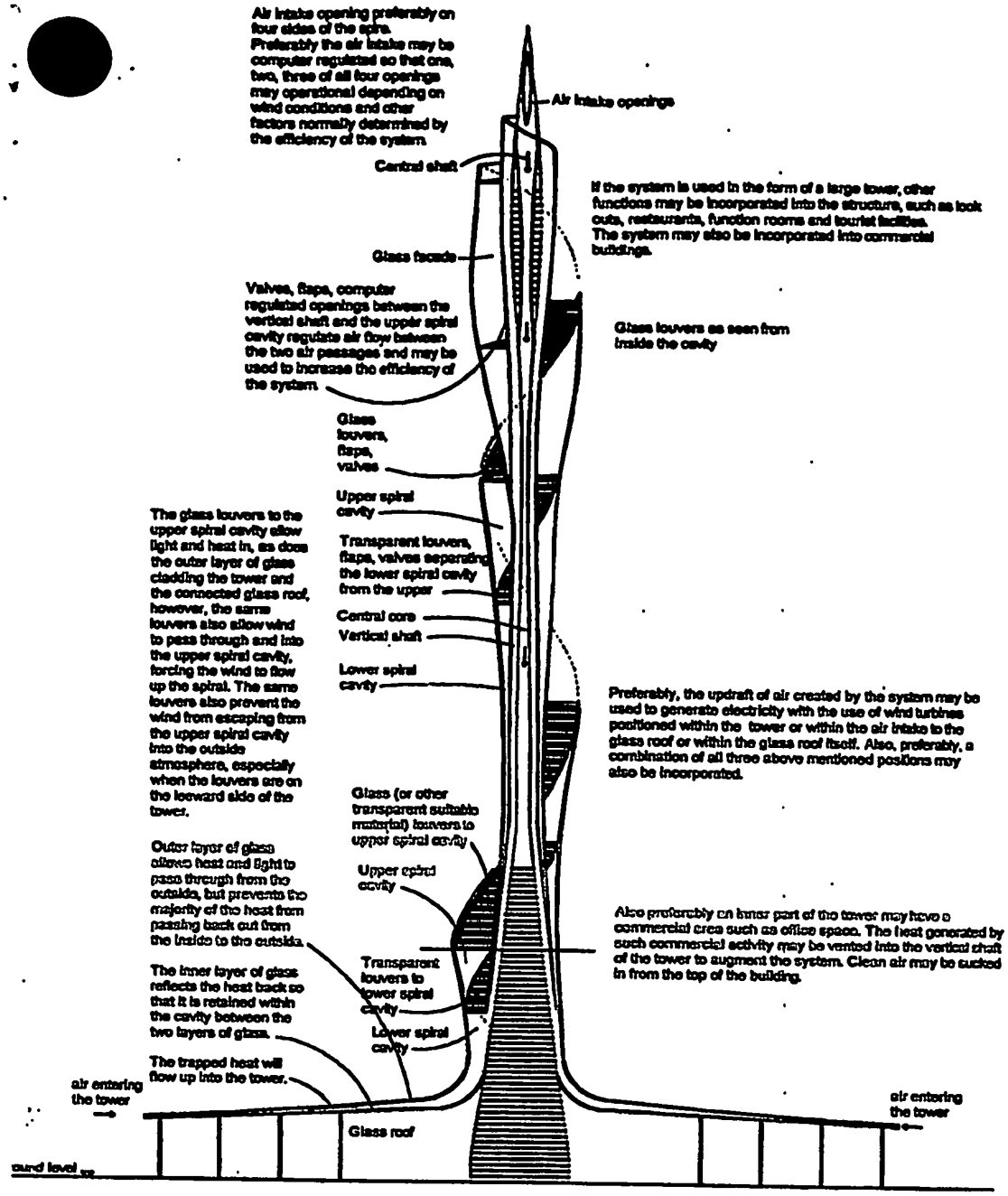
A

Stepped levels in spiral formation

Spiral cavity

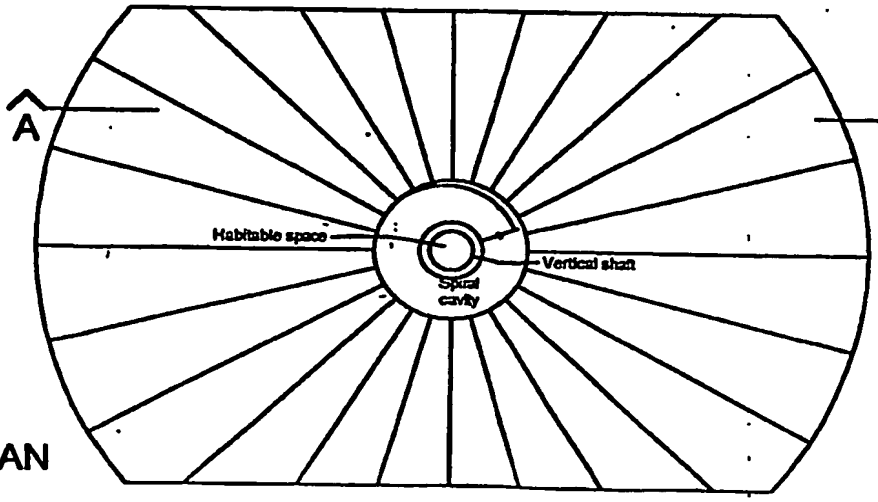
PLAN

SPIRAL TOWER - integrating the spiral facade, heat trap glass roof/facade, heat chimney and landscaped inner spiral



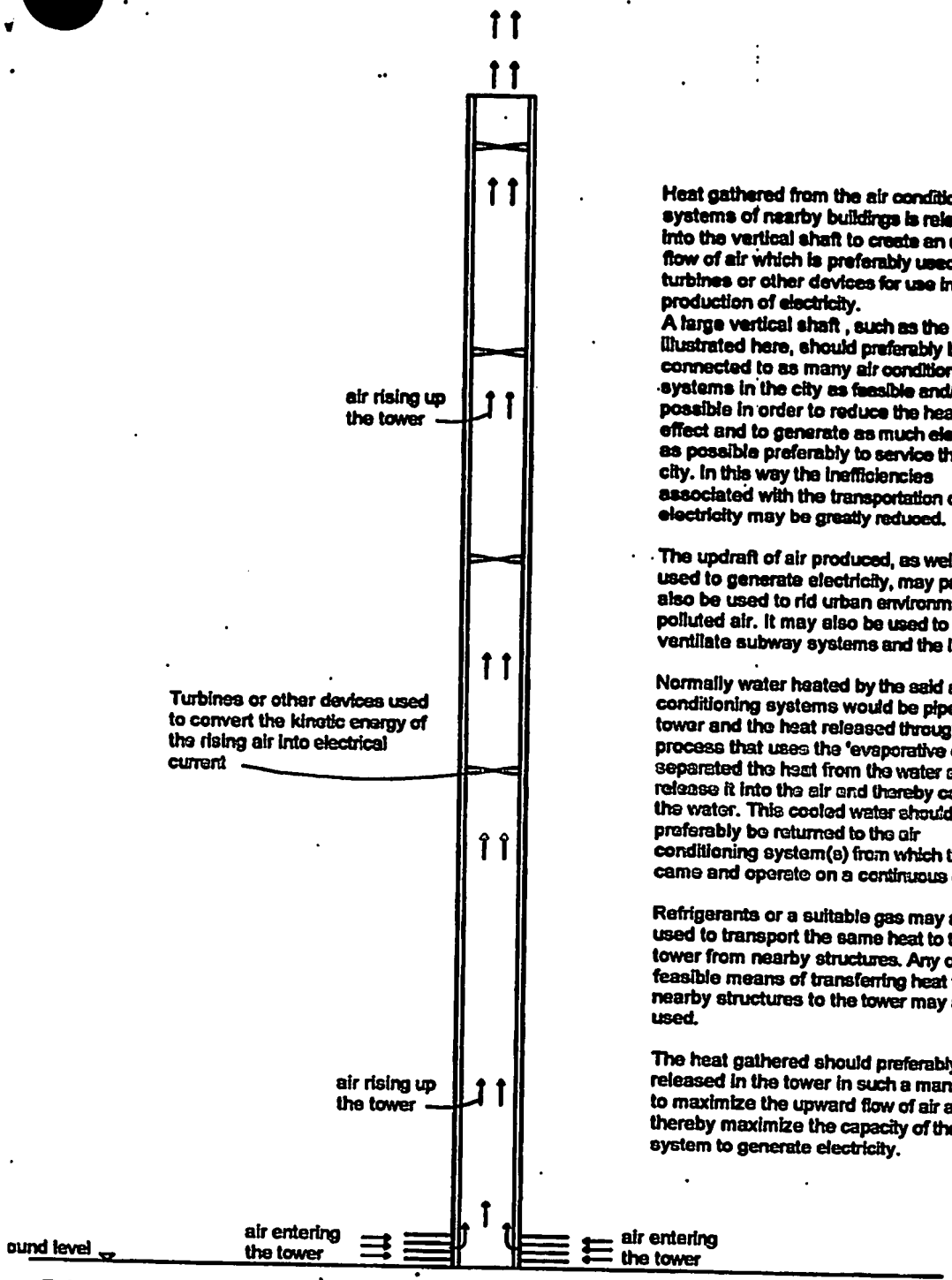
SECTION A-A

NB: The arrows indicate the direction of the movement of air within the system



PLAN

SPIRAL TOWER - integrating the spiral facade, heat trap glass roof/facade, heat chimney and commercial facilities



Heat gathered from the air conditioning systems of nearby buildings is released into the vertical shaft to create an upward flow of air which is preferably used to drive turbines or other devices for use in the production of electricity.
A large vertical shaft , such as the one illustrated here, should preferably be connected to as many air conditioning systems in the city as feasible and/or possible in order to reduce the heat island effect and to generate as much electricity as possible preferably to service the same city. In this way the inefficiencies associated with the transportation of electricity may be greatly reduced.

The updraft of air produced, as well as used to generate electricity, may preferably also be used to rid urban environments of polluted air. It may also be used to help ventilate subway systems and the like.

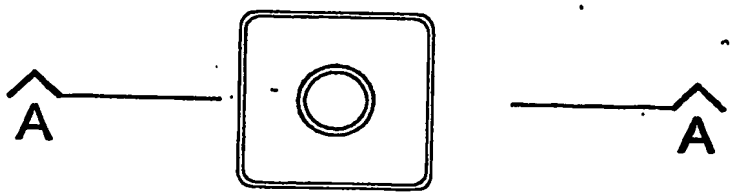
Normally water heated by the said air conditioning systems would be piped to the tower and the heat released through a process that uses the 'evaporative effect' to separated the heat from the water and release it into the air and thereby cooling the water. This cooled water should preferably be returned to the air conditioning system(s) from which they came and operate on a continuous cycle.

Refrigerants or a suitable gas may also be used to transport the same heat to the tower from nearby structures. Any other feasible means of transferring heat from nearby structures to the tower may also be used.

The heat gathered should preferably be released in the tower in such a manner as to maximize the upward flow of air and thereby maximize the capacity of the system to generate electricity.

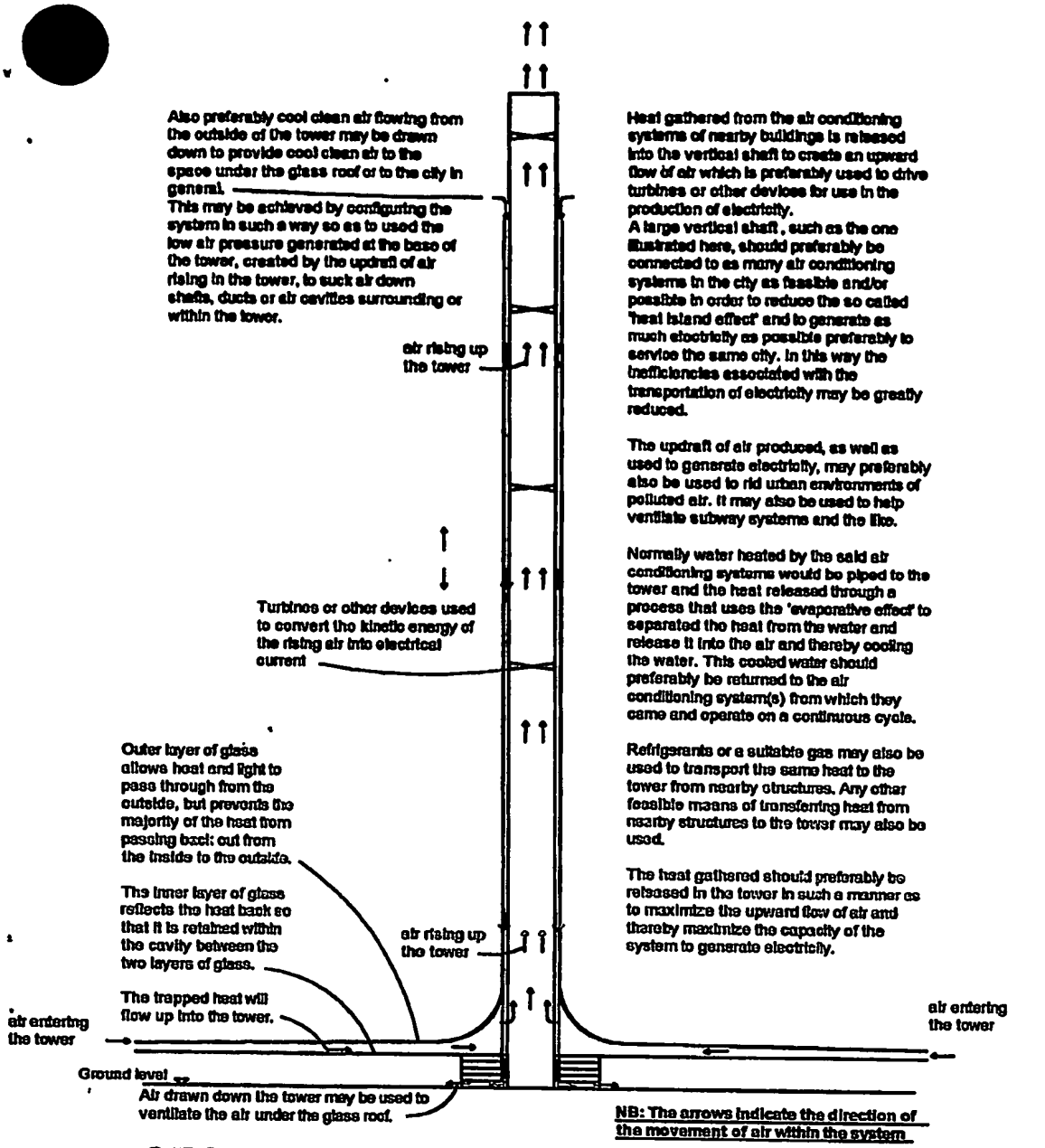
SECTION A-A

NB: The arrows indicate the direction of the movement of air within the system

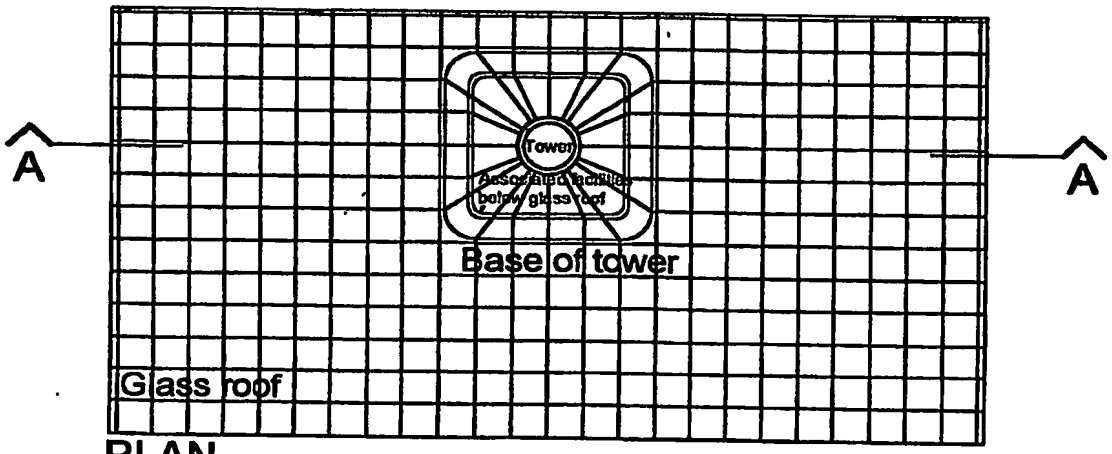


PLAN

THE HEAT CHIMNEY

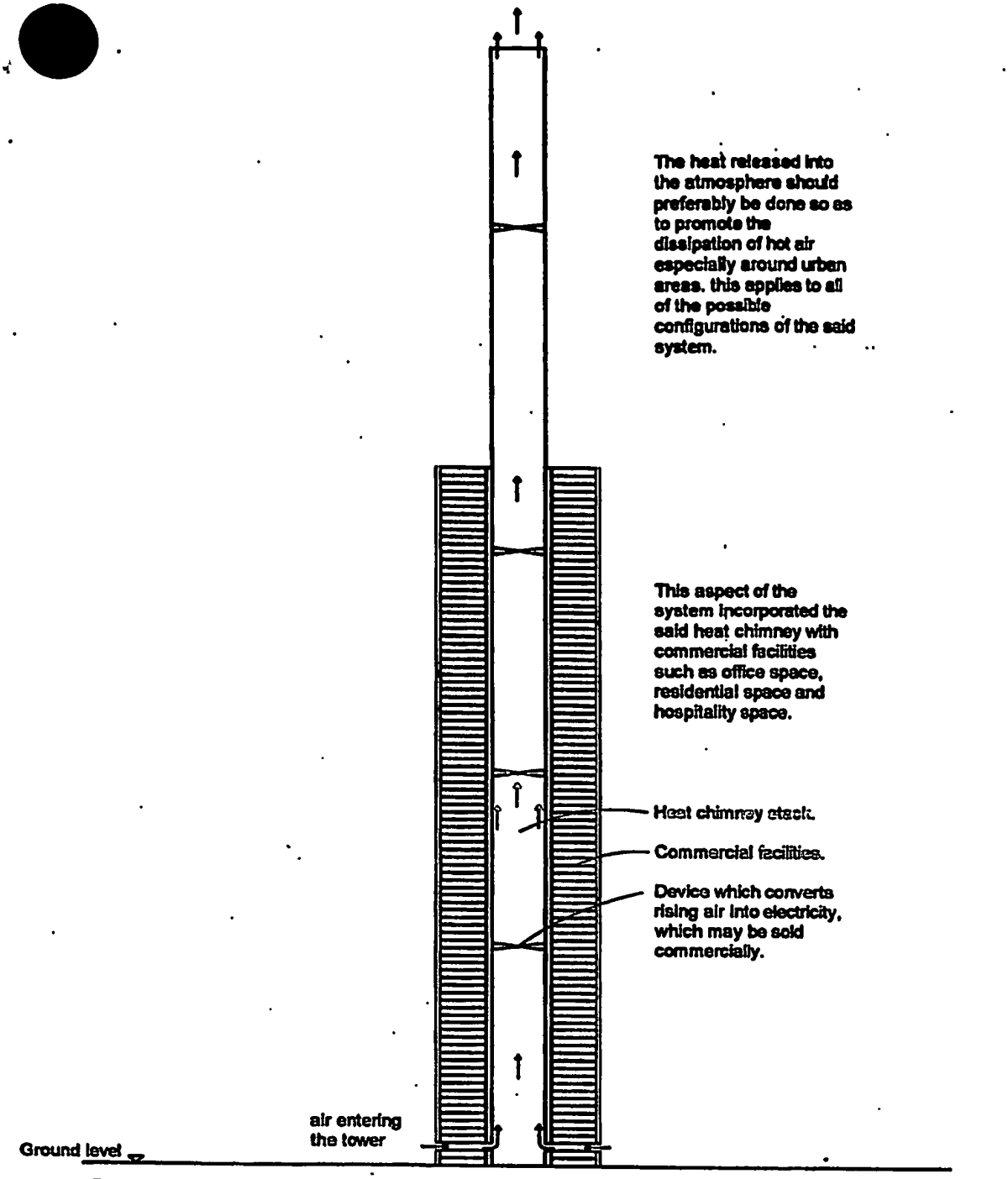


SECTION A-A



PLAN

HEAT TRAP GLASS ROOF + HEAT CHIMNEY



SECTION A-A

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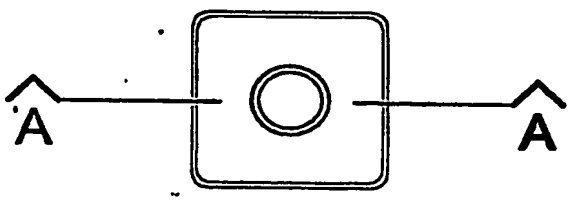
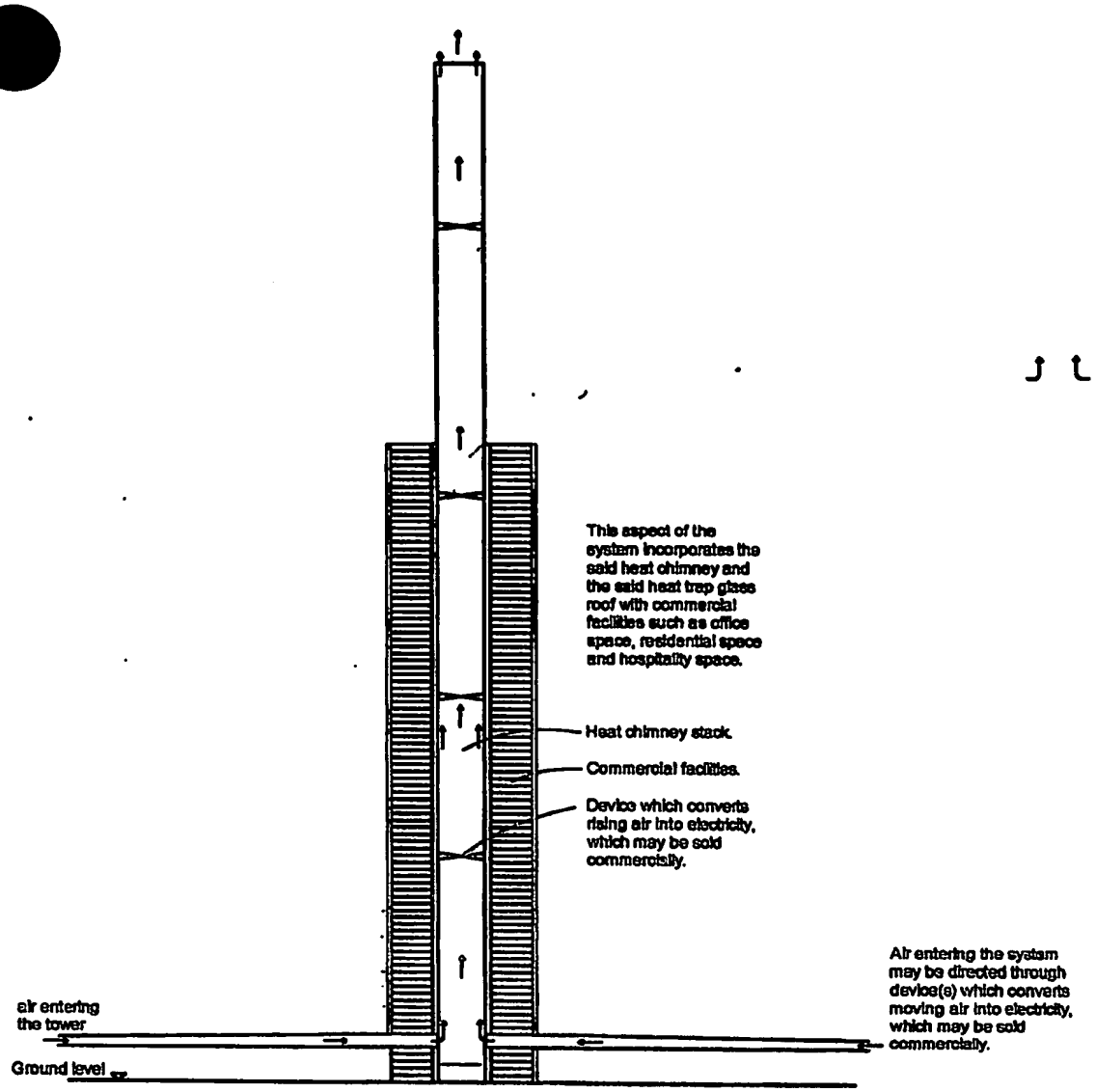


PLAN

THE HEAT CHIMNEY + commercial facilities



SECTION A-A

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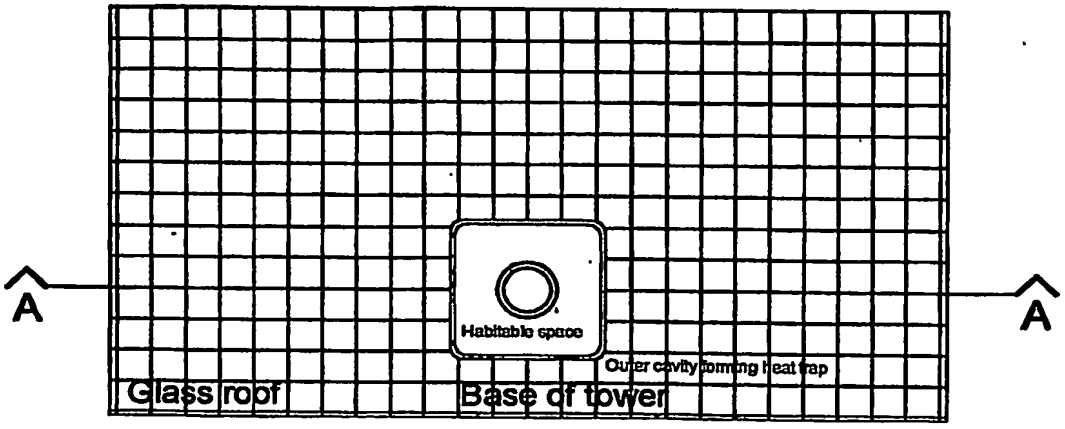
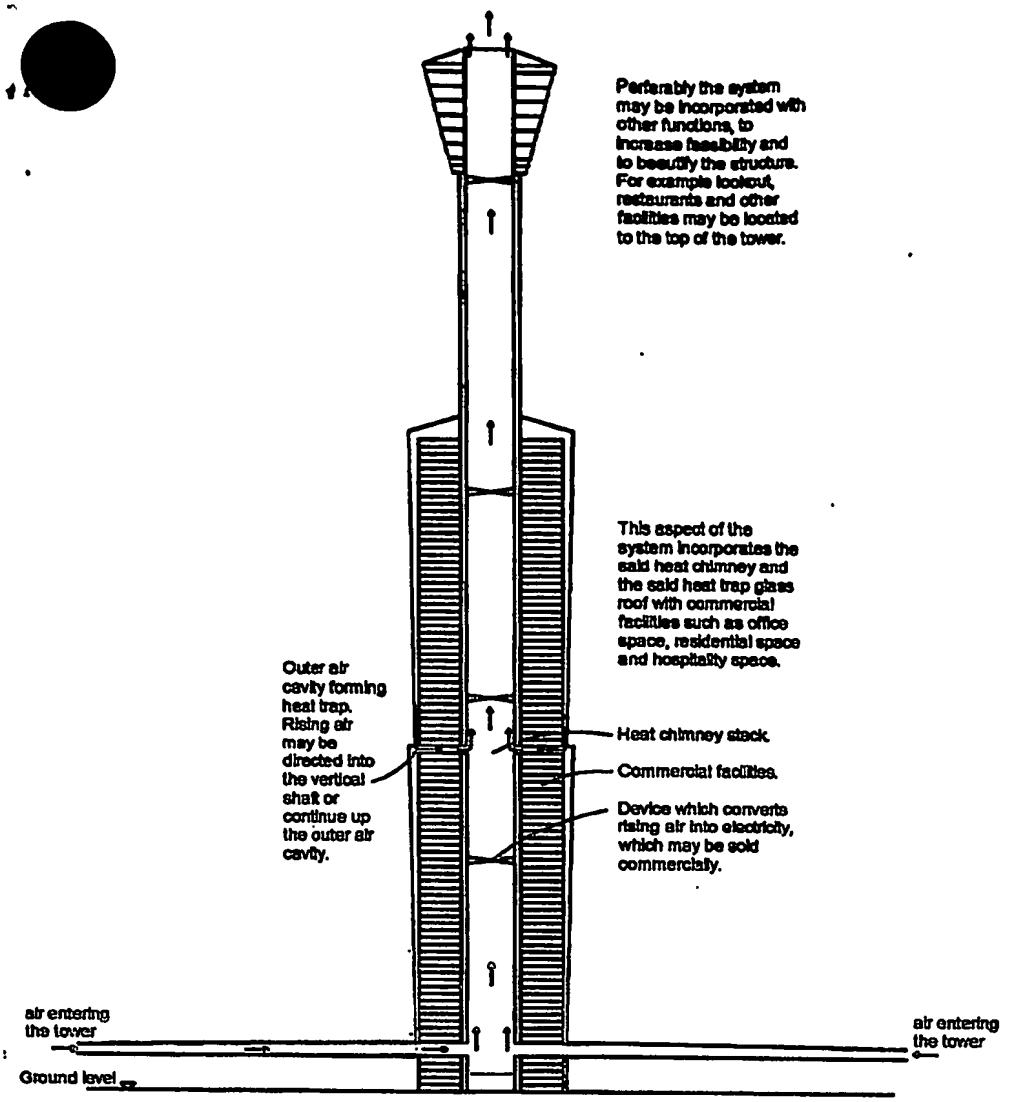


PLAN

HEAT TRAP GLASS ROOF + HEAT CHIMNEY
integrated with commercial facilities



SECTION A-A

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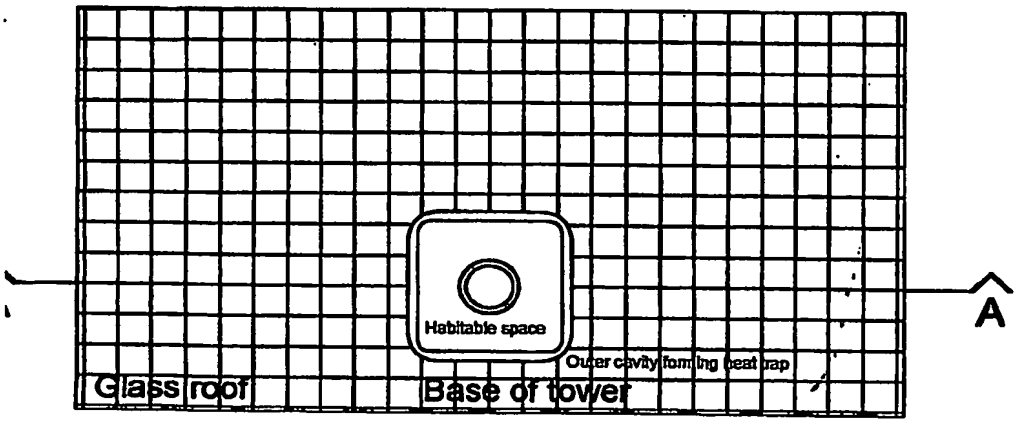
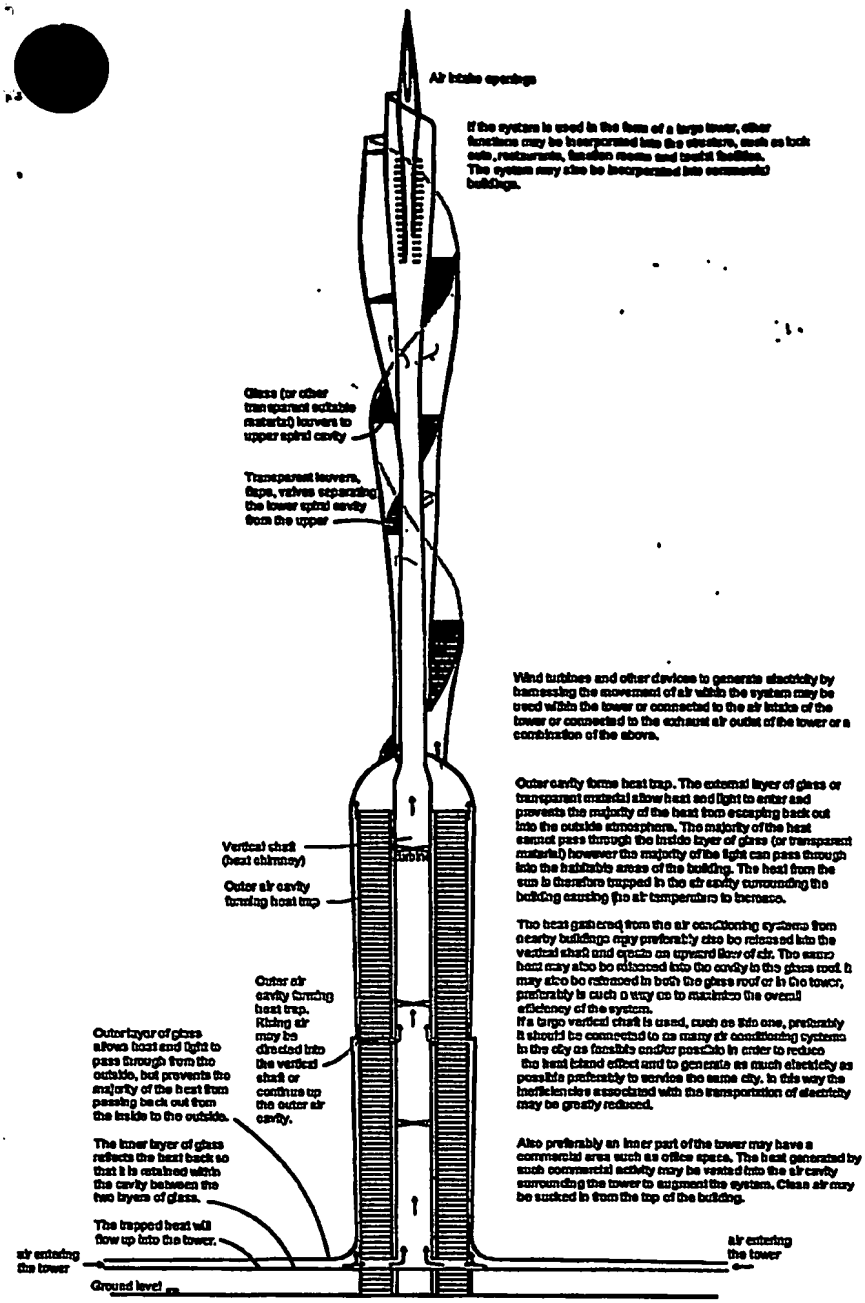
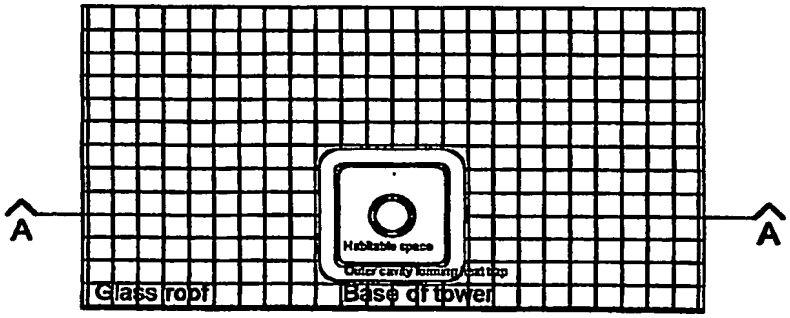


PLAN

HEAT TRAP FACADE AND GLASS ROOF + HEAT CHIMNEY integrated with commercial facilities + tower top facilities

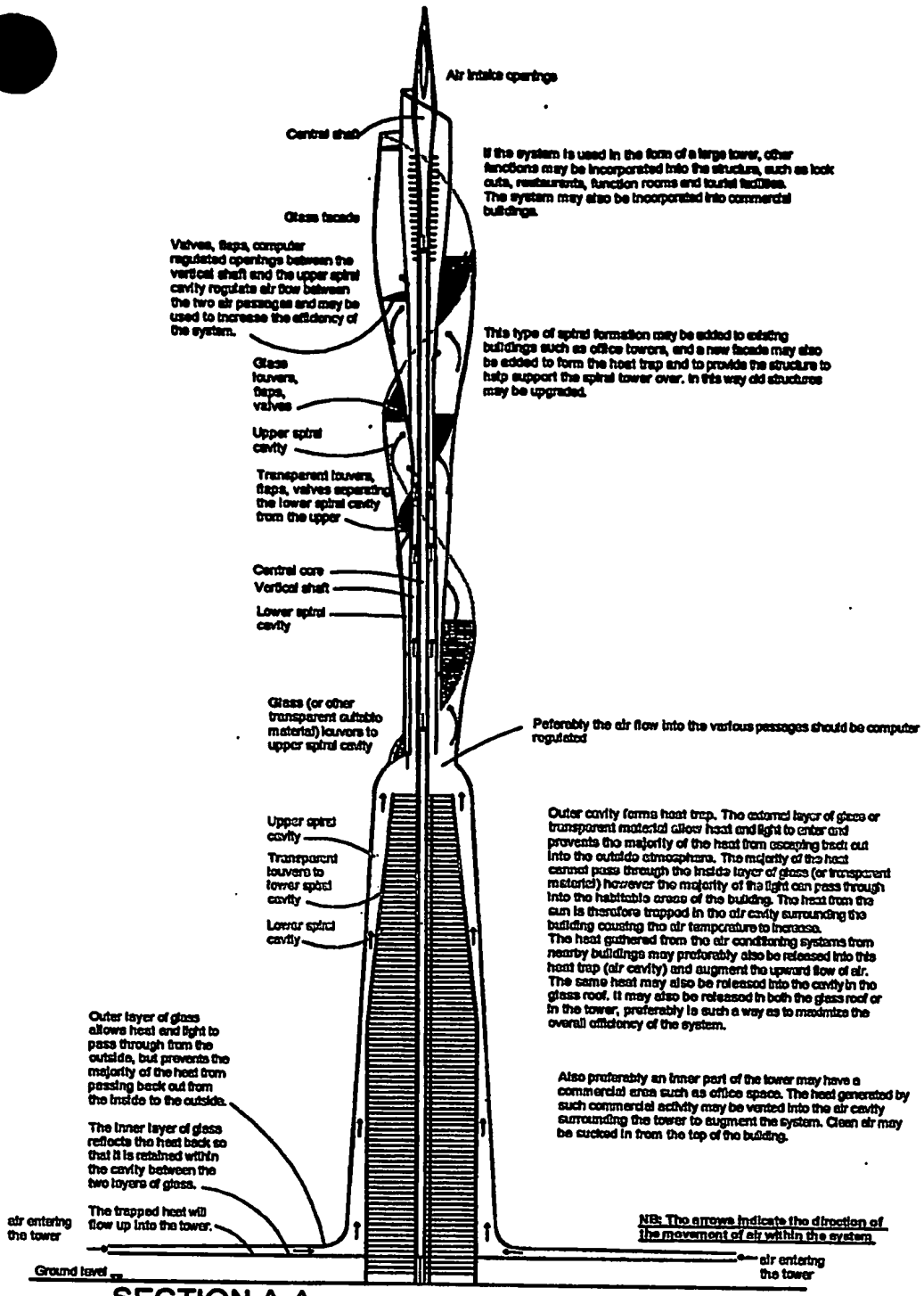


SECTION A-A

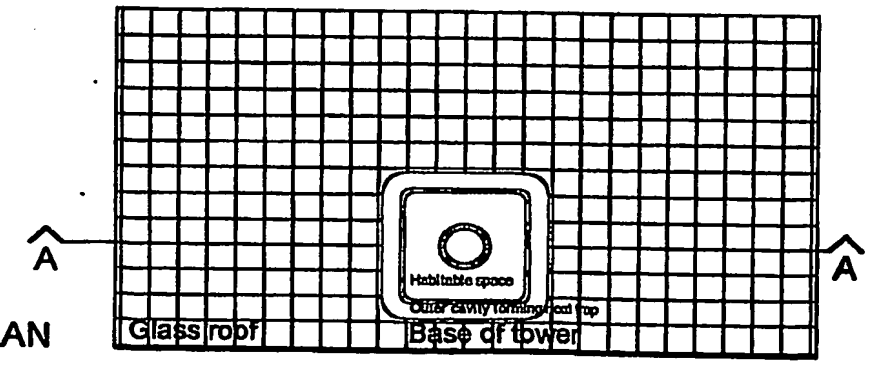


PLAN

HEAT TRAP FACADE AND GLASS ROOF + HEAT CHIMNEY + spiral cavity to top integrated with commercial facilities + tower top facilities

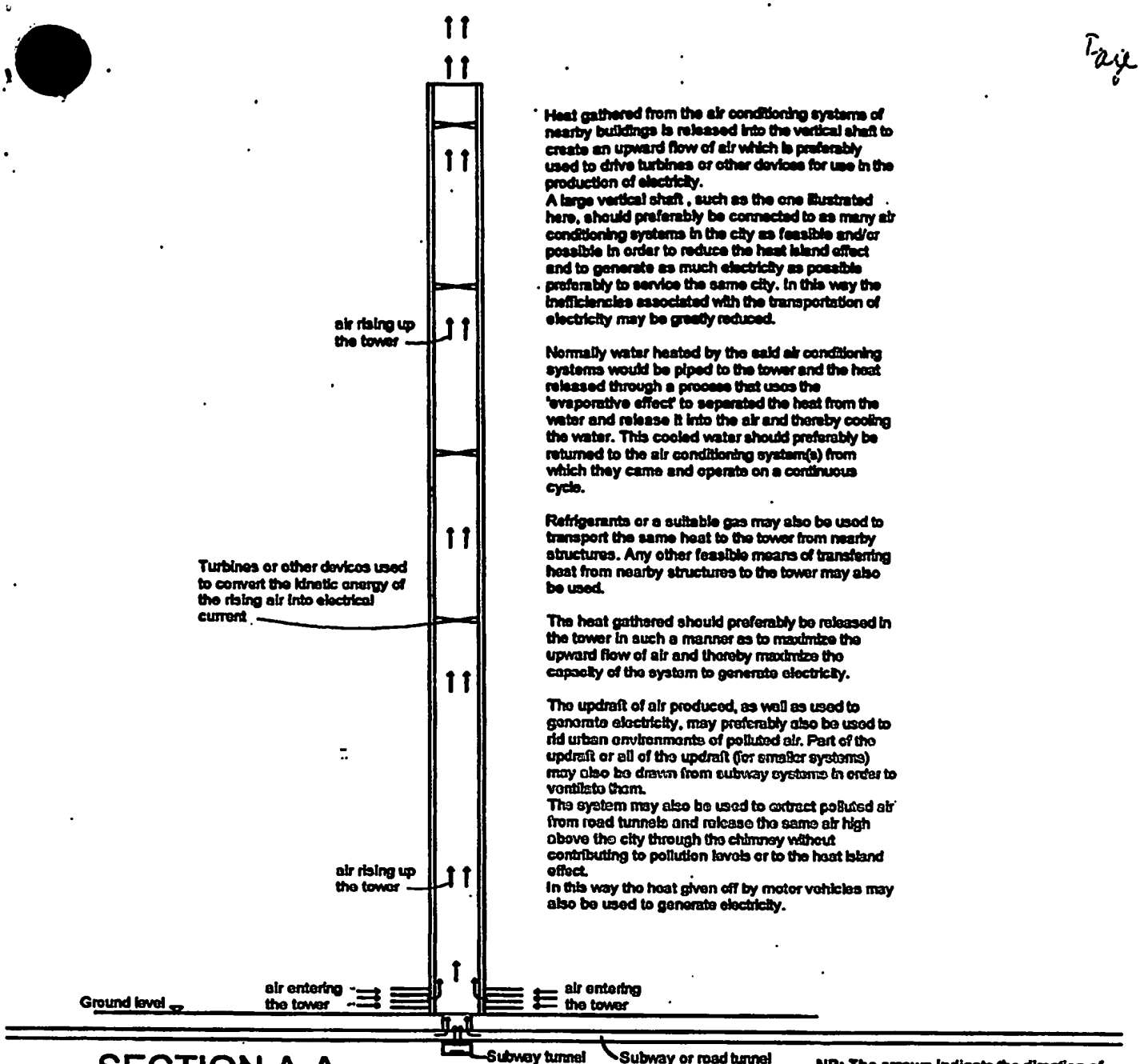


SECTION A-A



PLAN

HEAT TRAP FACADE AND GLASS ROOF + SPIRAL TOWER (to top) integrated with commercial facilities + tower top facilities



Heat gathered from the air conditioning systems of nearby buildings is released into the vertical shaft to create an upward flow of air which is preferably used to drive turbines or other devices for use in the production of electricity.
A large vertical shaft , such as the one illustrated here, should preferably be connected to as many air conditioning systems in the city as feasible and/or possible in order to reduce the heat island effect and to generate as much electricity as possible preferably to service the same city. In this way the inefficiencies associated with the transportation of electricity may be greatly reduced.

Normally water heated by the said air conditioning systems would be piped to the tower and the heat released through a process that uses the 'evaporative effect' to separated the heat from the water and release it into the air and thereby cooling the water. This cooled water should preferably be returned to the air conditioning system(s) from which they came and operate on a continuous cycle.

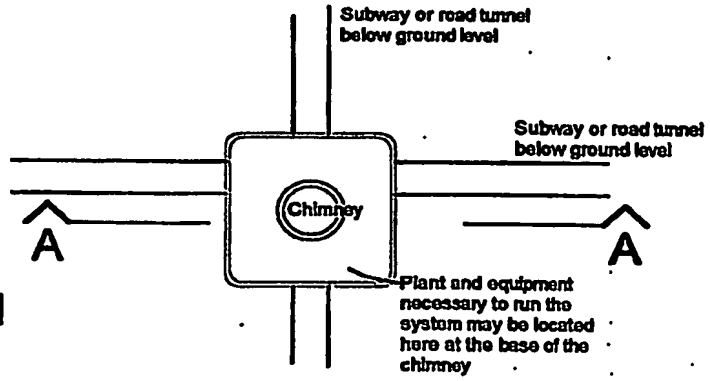
Refrigerants or a suitable gas may also be used to transport the same heat to the tower from nearby structures. Any other feasible means of transferring heat from nearby structures to the tower may also be used.

The heat gathered should preferably be released in the tower in such a manner as to maximize the upward flow of air and thereby maximize the capacity of the system to generate electricity.

The updraft of air produced, as well as used to generate electricity, may preferably also be used to rid urban environments of polluted air. Part of the updraft or all of the updraft (for smaller systems) may also be drawn from subway systems in order to ventilate them.
The system may also be used to extract polluted air from road tunnels and release the same air high above the city through the chimney without contributing to pollution levels or to the heat island effect.
In this way the heat given off by motor vehicles may also be used to generate electricity.

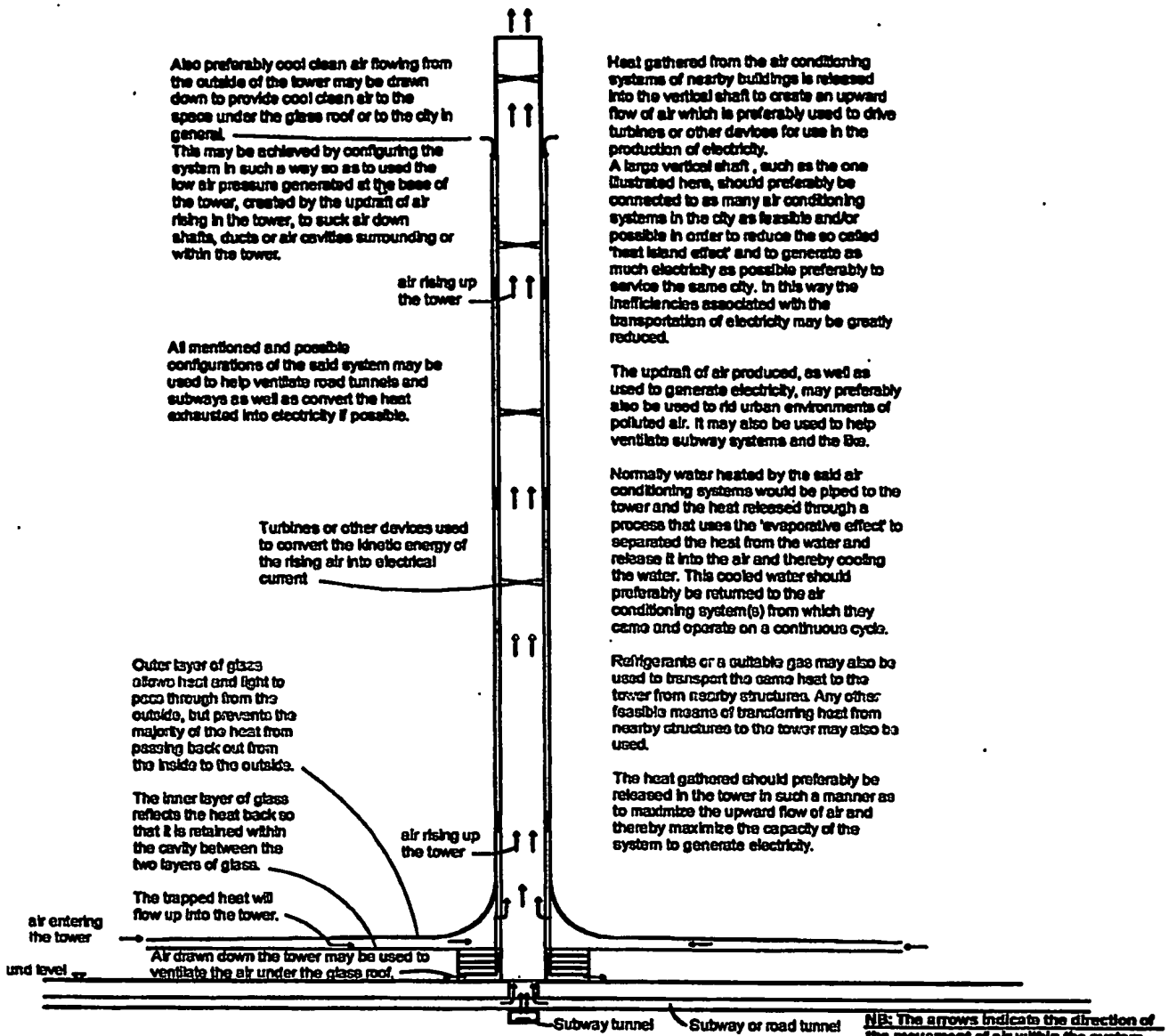
SECTION A-A

NB: The arrows indicate the direction of the movement of air within the system

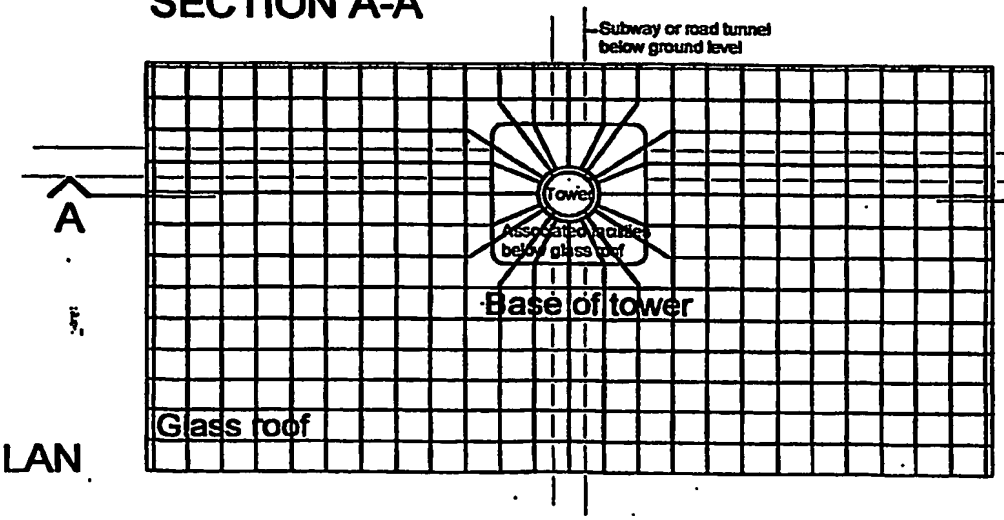


PLAN

THE HEAT CHIMNEY
integrated with subway and/or road tunnels

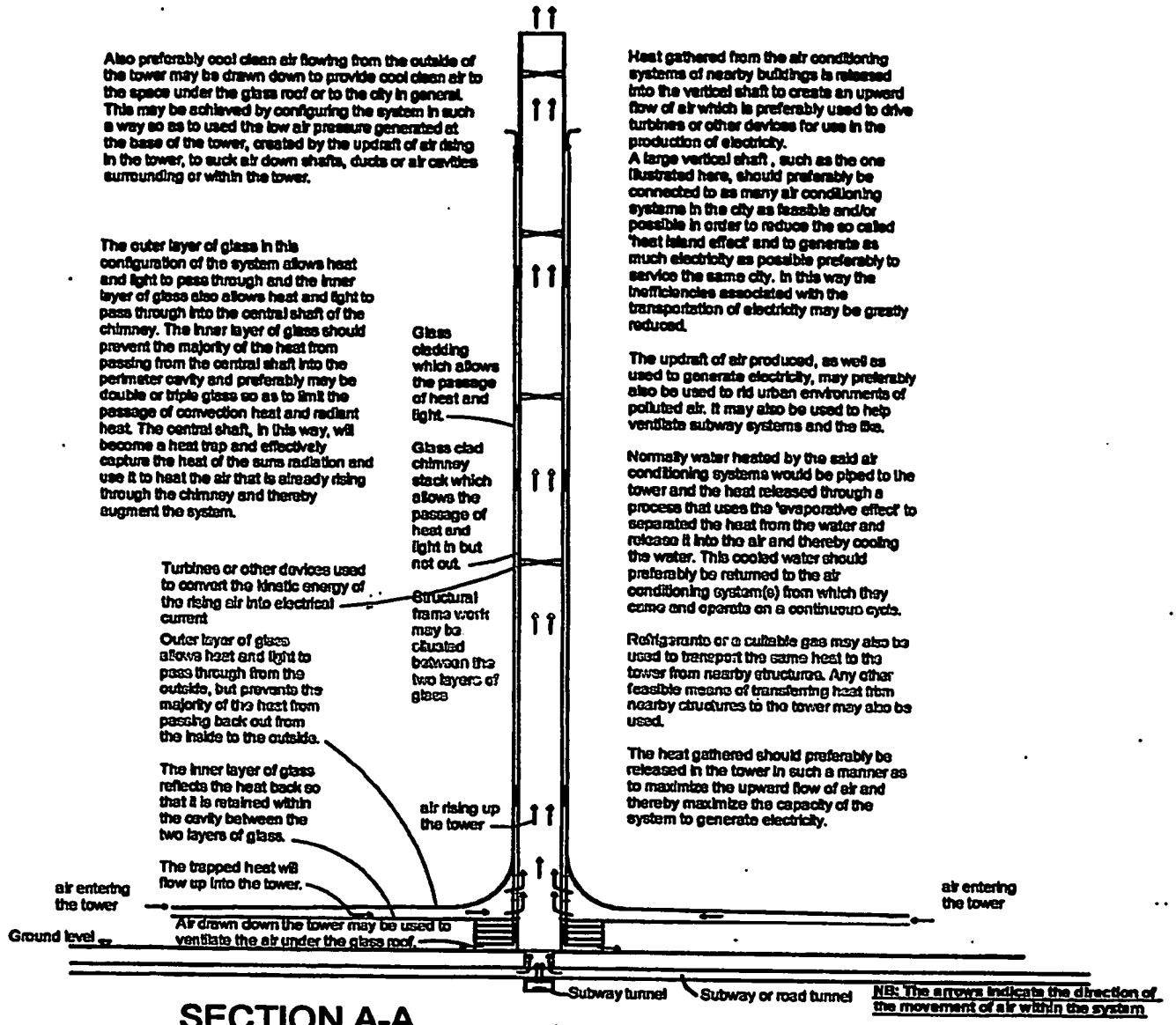


SECTION A-A

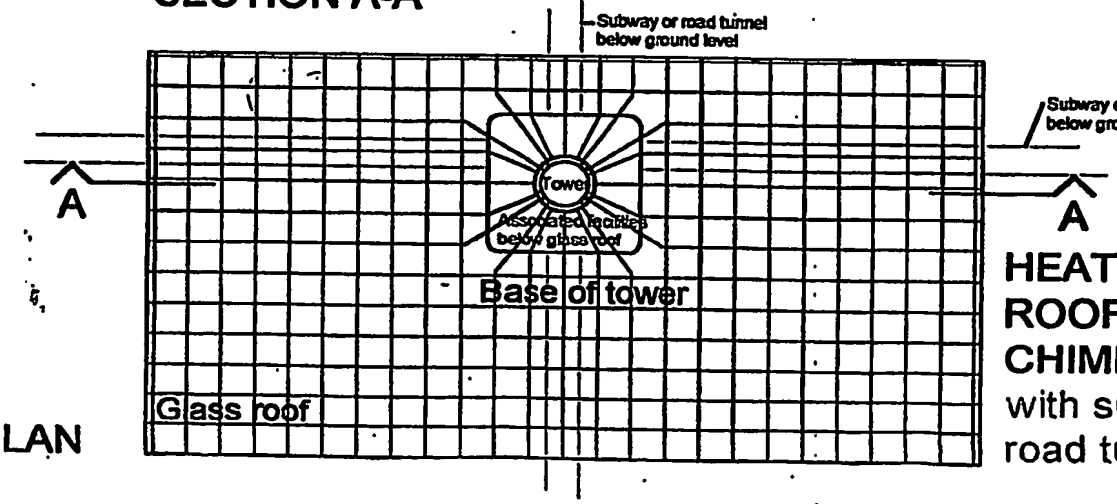


PLAN

HEAT TRAP GLASS ROOF + HEAT CHIMNEY integrated with subway and/or road tunnels



SECTION A-A



PLAN

HEAT TRAP GLASS ROOF + HEAT CHIMNEY integrated with subway and/or road tunnels